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IMPLICATIONS OF NEW MEDIA FOR SPACE AND BUILDING DESIGN.

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THE EXPANDING ROLE OF EDUCATIONAL TELEVISION AND OTHER INSTRUCTIONAL AIDS AND MEDIA IN THE LEARNING MEDIA IS DISCUSSED IN TERMS OF APPROPRIATE SPACE DESIGN AND SPACE UTILIZATION. THREE AREAS ARE IDENTIFIED IN THE NEW MEDIA--(1) PROJECTION DEVICES, (2) NONPROJECTION DEVICES, AND (3) TELEVISION. ARCHITECTURE AND DESIGN CONCERNS ARE DEFINED AS--(1) STUDENT RELATIONSHIPS TO THE AIDS AND MEDIA, AND (2) PRODUCTION, DISTRIBUTION, ORIGINATION, RECORDING (AUDIO OR VIDEOTAPE), AND STORING FUNCTIONS AS THEY APPLY TO THE SEVERAL MEDIA. TOPICS MENTIONED INCLUDE, SPECIFIC USES FOR THE NEW MEDIA, AND THE USE OF FUNCTIONAL VALUE OF SPACE, LIGHT, ACOUSTICS, AND CLIMATE. SPECIAL CONSIDERATIONS ARE GIVEN IN CONNECTION WITH TELEVISION--(1) PRODUCTION AND RECEIVING AREAS, (2) CLOSED OR OPEN CIRCUITS, (3) SPACE FOR PERSONNEL, EQUIPMENT, AND CONTROLS. ITEMS MENTIONED ARE INTENDED AS A CHECK LIST TO GUIDE PLANNING AND DESIGNING SPACE FOR FUNCTION AND USE ON NEW MEDIA. (MM)

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Implications of New Media for Space and Building Design

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One of the educational facts of our time is that as never before we must help meet informational needs of individuals, by providing information that is meaningful to and understood by the consumer—the learner.

In bold relief, then, stands this fact: the quantity and quality of our education must be rapidly and dramatically increased—quantity of educational facilities and educational tools, to serve both the numbers *and* the increasing number of years of formal education demanded by an education-conscious population; quality education that

Whitehead characterized as one where ideas can be *utilized, tested and thrown into fresh combinations.*

More and more there is an increasing dependency on technology as a governing economic and social factor. Our schools are not and will not escape this dependency—I would say must *not* if they are to meet the quantity and quality demand in education. Seldom, if ever before, has the efficiency of education been such a critical issue. Educational methods and processes are changing. The tempo and significance of the changes taking place today have reached a point where not only the enthusiasts but responsible observers are considering it to be a revolution in education.

Prominent among the revolutionary concepts is the expanding role of educational television and other instructional aids and media in the learning process.

Audio and visual techniques, long recognized and accepted as valuable stimuli to learning, are moving from an "occasional" role to "valuable aid" status. This expanding role brings us face to face with the prime question for our deliberation today: What space design and space utilization is appropriate for learning when these new tools are to be employed extensively?

Long-established conventional use-type concepts still dominate much of even the new schools built today. In the old buildings, of necessity, the new media when employed are used in makeshift learning environments—in space not planned for the purpose. Educators pondering the potential of the new media center their concern on questions of educational philosophy, on pedagogy, on cost, and on effectiveness of the new techniques. But design and space—the architectural problems have not always been recognized.

It will be helpful if we more carefully delineate the new media in terms of this breakdown:

Projection devices: motion pictures, filmstrips, 3-by-4 polaroid slides, 2-by-2 35-mm slides; overhead projectors, opaque projectors, shadow projection.

Nonprojection devices: teaching machines; language laboratories, audio recordings; radio; demonstration apparatus.

Television.

Architecture and design are concerned with: (1) student relationships to the aids and media, and (2) production, distribution, origination, recording (audio or video tape), and storing functions as they apply to the several media. In point of time: yesterday the book and the teacher as presenter were principal aids for learning; this

did not require much flexibility, so space was essentially fixed and rigid. Today the new media require that flexibility and adaptability be the keynote of design. What the architect executes in design will depend upon his understanding of the educational process as it is defined and communicated to him by those responsible for underscoring educational philosophy and role and the place of the new media in that philosophy and in that delineated role. The first step then is to get a fix on the educational "posture"—that is, the function of the school board, the school administrator, faculty, students, parents, and the community, and of the collaborators they bring in to resolve points of dilemma—consultants, suppliers, manufacturers, and the researcher in person or through his reports. These are the architect's task force.

Specific Uses for the New Media

Specific educational uses can and should be defined for all kinds of materials, facilities, and systems—the new media instructional tools whether they are employed separately or in combination. I would submit the following as some of the principal uses:

1. Organizing and recording high quality instructional programs.
2. Storing of programs (film, video tape, audio recording) for distant or remote and future use.
3. Providing means for pretesting and improving program quality and appropriateness for students.
4. Repeating and presenting instruction and learning opportunities where and when necessary to advance the learning of students to achieve defined levels (criteria) of testable academic proficiency.
5. Making available instructional resources from other regions and institutions or from outside the normal reaches of a school system.
6. Providing a means of sharing the resources of the school system with other school systems and the surrounding communities.
7. Increasing the scope, strength, quality, and duration of organized stimulation for the learning of students.
8. Providing the school system with the means of contributing to the educational and intellectual resources of the state, nation, and culture as has been done by printing for centuries.
9. Providing students with interests and learning habits for the continuing uses of the newer modern media of communications for their intellectual advancement.

10. Contributing to the development of the art and the science of teaching and the advancement of skills and abilities of students for effective learning.
11. Providing a practical means for extending the influences and effects of and opportunities for varied kinds of learning to large numbers of students.
12. Providing public visibility for the developing school system.
13. Assessing and evaluating educational gains.

By training and innate feel, the architect is capable of executing factors of shape, proportion, material, lighting, color, and acoustics for their psychological effect. The use or functional values as applied to new media may be a problem for him unless function is carefully illuminated and communicated by those responsible for planning the educational program.

Space, Light, Acoustics, Climate

The shape of the space will be determined by activities of the learner. Viewing and hearing *and* discussion are two principal activities to be considered and defined. Much use of space may be accomplished by flexibility which permits (1) changing and rearranging seating and furniture, as required by (2) movable partitioning and (3) adjacency of areas for related activities.

It should be remembered, too, that space is volume rather than an area in one plane. In the case of television, for example, space affects both viewing and hearing. Viewing area is a function of width of image. Relationships of image and viewing area are determined by: (1) minimum distance (determined by relationship of image to nearest viewer), (2) maximum distance ("viewability" to most distant viewer), (3) horizontal sight line, and (4) angle of elevation. Type of material to be viewed is also a factor—color, contrast, size of figures or symbols. Output of equipment (image brightness), environment factors of temperature and ventilation, type of seat, type of seating arrangement, and acoustics are other important considerations. Size of group appropriate for a particular learning experience affects space requirement and space design; for example: individual study space with many media components such as TV receiver, audio playback, and teaching machine; individual listening station using radio receiver and audiotape machine; group listening stations; conference areas, large and small. Different types of projection methods have different space needs; determination whether rear screen, front screen, or indirect shall be used will grow out of an analysis of such advantages and disadvantages as ambient light, noise, accessability, and heat.

In the learning space, lighting and illumination affect *visibility, comfort* (glare and strain), *effect* and *atmosphere.* But in learning space our concern should rest also with attention that light can command: the amount of light on tablet area or desk area, and the amount of light on the information source, which varies with projected or non-projected images. Variable light intensity control is desirable. In TV the problem of glare on the receiving instrument can be a major problem; the design plan can eliminate this.

Acoustics are too often given little consideration in school space. It is economical to effect good acoustics if they are planned; modification and adaptation are expensive. Acoustics are as important as lighting. Factors of transmission (one space to another) and isolation—absorption and reflection within space itself—are functions on which specialists can best advise. Good acoustics don't just happen.

In space, plan and design factors which affect comfort and convenience should not be overlooked. A body of research information in learning efficiency and work efficiency is growing each year. One of the factors studied has been climate control. In the South these findings have a particular applicability. Building planners ought to reenforce decisions based on known research. The gear and paraphernalia of the new media further affect heating and cooling functions and also convenience factors; for example, false ceilings may be a way of providing for cable runs and may serve also as an area for discharge of heat from equipment which can be exhausted by fan rather than thrown into room and on air-conditioning load of the room.

I would also plea with planners for display and exhibit area in our school buildings.

Designing Space for Television

To adequately design building space in which television is to be used it is necessary to predetermine what use we wish to make of television. Among the considerations may be whether television is to be used for direct teaching in the classroom, on an organized sequential basis within the scope and sequence of the regular curriculum, as opposed to out-of-school viewing. Furthermore, it must be determined whether television is to be used for the total teaching job or is to provide only part of the learning experience, where classes receive basic information via television with the classroom teacher sharing major responsibility for providing further learning experience. If only occasional "enrichment" uses are preferred, then facility and scope of the television operation should be limited accordingly. A

word of caution should be introduced; defining the *present* uses of television often brings the limitation of underplanning. It has been the experience of most systems that once television is introduced its uses grow and multiply.

Building design should include planning for flexible expansion. How television is used and the instructional load it is to carry affect decisions on space for *production areas* and *receiving areas.* In the receiving areas or centers, building design and plan must take into account the possibility of receiving televised signals from outside sources, either open circuit or microwave, using antenna and internal multiple room distribution facility.

Because of limited enrollment it may be appropriate for a school system to think only of closed-circuit operation, particularly if there are no educational television stations in the area. In such a situation, that school will probably be a self-contained originating *and* receiving area. In schools with larger enrollments it may be appropriate to think in terms of receiving outside-the-school origination and supplement with intraschool live origination requiring small studio, video-tape recorder(s), film chain, and distribution facility. In such a situation it becomes possible to multiply the number of sources or layers of program information, thereby diversifying programs and increasing the choice of information sources. For example, it may be possible in such circumstances to program, at the same time on different channels, programs for a third grade, a fifth grade and a sixth grade. Planners soon discover the economics of distance to be a factor in determining whether a closed circuit or an open circuit is most feasible; also, the availability of a reserved educational channel assigned to an area will weigh heavily in considerations.

The amount of space and type of space necessary for origination of programs will be related directly to the decision on function or use of television in the system. There is no typical television system or layout. Good planning implies that layouts are tailored to use, function, and economics. In planning television space and facilities requirements, consideration also must be given to space for personnel involved in production. This includes not only staff office space, but conference space. Also, office and work space for those who are serving as teachers on television is important. It is helpful to have these persons in close geographical proximity to the producers and near the equipment and tools with which they will work while performing on television.

Program origination also means there must be space for the equipment and paraphernalia for production, in-

cluding lighting and staging; corollary to that must be a concern for air conditioning, ventilating and acoustics—all factors that have design and plan implications.

Program origination also requires space for control room areas, both for studio and master control; space for film projection; space for recording equipment; maintenance space; storage space for materials and props; program storage space which will include tape and film raw stock and taped or film programs held for future scheduling. A materials center or distribution center which will manage the traffic function for the flow of stored program information on tape or film or other type of recording introduces other space problems. Also, darkroom processing area for film and space for an art and visuals center figure heavily in space demands. And—there must also be space for next year.

The equipment and gear of television also affect space and design. Building planners should take into consideration the space implications of the video system, camera chains, projection equipment, video-tape recorders, and the control and distribution functions related to this system; also, the nature and function of an audio system, intercom, open-circuit transmitter equipment, transmitter gear, and transmitter space. Closed-circuit television requires consideration of the kind of distribution system—whether by radio frequency or by video with separate accompanying audio distribution.

Receiving equipment may require certain design. Shall monitors be hung from the ceiling? On movable stands? Should a large screen projector be used?

Lighting requirements have implications for space and design. Complex lighting systems should be built into the early planning and design of a production area. Here electricity loads become a prime consideration. Staging also places certain requirements on space and design; such things as ceiling heights are important. Early advisement on staging matters is a must.

My remarks have undoubtedly raised more questions than they have answered. But it is my hope that from what I have said it would be possible for you to compile a check list of some considerations to be kept in mind when planning and designing space for function and use of the new media in education.

Dr. Taylor then introduced John Fornara, a private architect in Atlanta, Georgia. Mr. Fornara presented a series of slides showing various solutions relative to classroom designs for educational television. Such problems as flexibility and its limitations, acoustics, ventilation, and sight were highlighted in the